The Supernova Legacy Survey – SNLS

Web Sites: *http://cfht.hawaii.edu/SNLS* (which includes a list of participants)
http://legacy.astro.utoronto.ca/ (SN candidates)

Goals:
- 700 spectroscopically-identified SNe Ia (> 1000 with multicolour lightcurves)
- redshift range $0.2 < z < 0.9$
- final error in w approaching ± 0.05 (around $w = -1$, Ω_M prior from CFHTLS weak lensing)

Description
- 4×1 deg^2 fields, imaging in $g'r'i'z'$ bands
- 5 epochs per 17 night dark run
- queue scheduled observing at CFHT with MegaCam
- 5 years of imaging ($\sim$ 1300 hr) guaranteed (completion 2008)
- spectroscopic followup at VLT, Gemini, Keck, and Magellan (as much 8m time as CFHT time)

Current Status: 180 SNe Ia spectroscopically confirmed since late 2003

Summary: After only 20 months of operation, the Supernova Legacy Survey (SNLS) has more confirmed Type Ia supernovae (SNe Ia) and better light-curve cadence and filter coverage than ever previously achieved. We are within reach of our goal to (i) spectroscopically confirm 700 SNe Ia by 2008, and (ii) use these SNe to determine the nature of the Dark Energy driving the accelerating expansion of the universe, via a measurement of the equation-of-state parameter, *w*. Such a legacy-quality data set will also provide the control over systematics, which will form the cornerstone of third generation studies to determine changes of *w* with redshift.

Operationally, the SNLS is an extraordinary success. We are finding supernovae in the expected numbers, and CFHT queue scheduled observing is functioning well in providing our required time sampling. We have created new, more efficient pipelines for real-time and final data reduction, SN discovery, follow-up spectroscopy, SN typing, light-curve fitting, and database manipulation. Our large allocation of VLT/Gemini/Keck spectroscopic time (averaging 140 hr per semester) continues for SN Ia identification. We exploit our new techniques to preselect likely SNe Ia ensuring the most efficient use of this time. Our first publications have been submitted. Additional follow-up programs are underway to leverage the investment in this survey and contribute to its continuing legacy value, including an intensive Keck spectroscopic rest-frame UV study to understand progenitor metallicity, a study investigating the first use of Type II SNe as cosmological probes, and a Magellan near-IR program investigating the effects of dust extinction on SNe Ia.

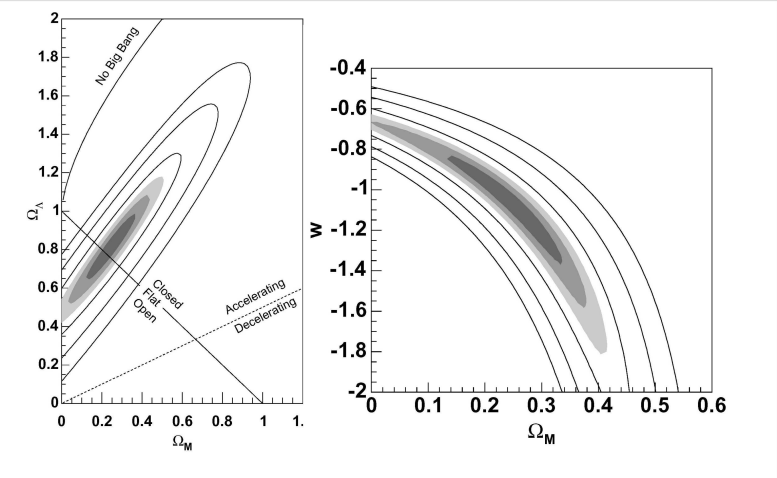

Fig. 1– *Preliminary* analysis of our first year of data *(solid contours)*. The contours (statistical only) are 68%, 95%, and 99%. Already we have smaller errors than Knop et al. (2003) and other recent ground-based results, with just the first year of data (when the survey was running at only 50% efficiency). For reference, the shaded area shows the expected results at survey end in 2008; note the dramatic improvement that can be expected with our goal of 700 SNe Ia. Combining our survey-end data with an Ω_M prior from CFHTLS weak lensing gives a statistical error for w of about ± 0.05.